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There is considerable evidence that many high school students are losing interest in science (Yager and Lutz, 1995). I am involved in the training of science teachers, and I wanted to develop a student-centred approach which would present this issue to future science teachers. I believe it is not only important for them to be aware of this problem, but also to be aware of the classroom practices which may exacerbate it, so that these practices can be avoided. This article describes a technique in which non-science college students were used to present these issues to preservice science teachers. It was carried out at the beginning of a one semester subject in science teaching methods.

The first step in the technique was to elicit and record some non-science-specialists' views about science teaching. A group of preservice elementary school teachers was chosen because research has indicated that students such as these often hold very negative views of science (Tilgner, 1990) and I hoped that their opinions would be quite confronting. A discussion was used to elicit their thoughts about the teaching of science. As a stimulus to the discussion, I firstly read aloud a newspaper article which reported high school students' loss of interest in science. The preservice elementary teachers were then asked to comment on their own personal experiences of high school science. The ensuing discussion lasted just over 20 minutes, and covered their views about the features of good science teaching and poor science teaching. This session was videotaped.

The second step was to show the preservice science teachers the videotape of the discussion. I told them that the people in the video were successful graduates, but from a non-science background, and that the content concerned their personal experiences of high school science. After watching the video I asked them to provide anonymous written responses to the question "What did you learn about science teaching from this video?"

In response, the majority of the preservice science teachers (14 of the 18) wrote that the main thing which they had learnt was that not all students enjoyed science in high school. For example,

"I didn't realise other people felt this way about science."

"Student interest in science is largely dependent on the way science is taught - many students [are] turned away from science . . . due to it being perceived as boring and too difficult. It's up to science teachers to make the subject interesting. If students are interested, then they will find it easier to learn and are more likely to continue studying . . ."

"[The video] gave an insight into the students' thoughts about science. It doesn't sound like it is the actual subject they dislike, it is the way it was taught."

"Science teachers have to present and teach their subject in an interesting, imaginative and informing way to gain the interest of students. Theory and exciting practicals need to be integrated to capture attention."

In addition, many of them commented on specific teaching strategies which had been described in the video as having a negative impact. These included lack of encouragement for student questions, rote learning from textbooks and the chalkboard, lack of attempt to relate the subject to real life, lack of open-ended science experiments, and the portrayal of science as a male-dominated subject. For example,

"[I learnt] that students often view science as hard, boring and not related to the real world. They also often felt the mystery of discovering the results of experiments was lost when teachers demonstrated the experiment first and told them the answer. I think students would enjoy science more if they were allowed to seek the answers themselves more and weren't discouraged from questioning."

"[I learnt] that people enjoy learning through experiments and interaction with the 'real world' more than rote learning from textbooks because it shows the relevance of what they are learning and makes it more fun. Those [students in the video] subjected to rote learning rapidly lost interest in science and learnt little from it as evidenced by their remembering little of what they had been taught."

I believe that the strategy of using non-science-specialists was successful in introducing the preservice science teachers to the big issues of what poor science teaching looks like, and conversely, what good science teaching must look like. Their comments, as evidenced above, provided evidence of some genuine movement towards an understanding of other peoples' points of view, and gave them some insight into the views which could be held by the high school students whom they will be teaching in the future.

I also felt that the activity had provided a good introduction to the science methods course because the graduates had written about a wide range of issues (such as the use of textbooks and the importance of open-ended experiments) which were relevant to the teaching and learning of science. During the rest of the semester, it was possible to build upon many of these issues and to relate them back to the original video.

One problem which I experienced with the technique was the poor quality of the sound recorded on the videotape. Using a video camera alone, it was difficult to clearly record every word which the non-science students were saying in their discussion, especially those who were sitting further away from the camera. As a result, some of the dialogue was a little hard to follow while watching the video. At the moment I am investigating ways of having a portable microphone attached to the video camera.

As a postscript to this study, it is worth mentioning the peer teaching sessions which the preservice science teachers were required to present later that semester. These were whole-class events and I was pleasantly surprised at the effort which they had put into finding interesting and open-ended activities to complement the theory, and their efforts to relate the concepts to real life situations. I felt that this was evidence that they were putting into practice a number of the ideas which had originally been provided by the non-science graduates.

References

1. Tilgner, Penny (1990). Avoiding science in the elementary school. Science Education, 74(4), 421-431.
2. Yager, Robert and Lutz, Martha (1995). STS to enhance total curriculum. School Science and Mathematics, 95(1), 28-35.